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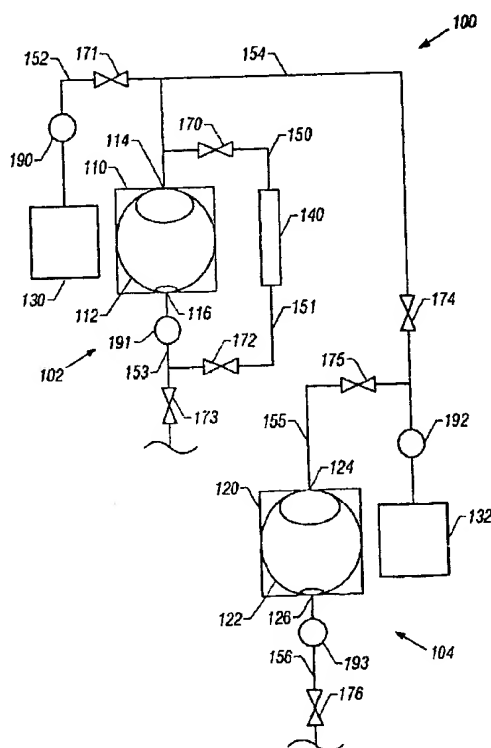
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[Continued on next page]

(54) Title: CLEANING SYSTEM UTILIZING AN ORGANIC CLEANING SOLVENT AND A PRESSURIZED FLUID SOL-
VENT



(57) Abstract: A cleaning system that utilizes an organic cleaning solvent and pressurized fluid solvent is disclosed. The system has no conventional evaporative hot air drying cycle. Instead, the system utilizes the solubility of the organic solvent in pressurized fluid solvent as well as the physical properties of pressurized fluid solvent. After an organic solvent cleaning cycle, the solvent is extracted from the textiles at high speed in a rotating drum (112, 122) in the same way conventional solvents are extracted from textiles in conventional evaporative hot air dry cleaning machines. Instead of proceeding to a conventional drying cycle, the extracted textiles are then immersed in pressurized fluid solvent to extract the residual organic solvent from the textiles. This is possible because the organic solvent is soluble in pressurized fluid solvent. After the textiles are immersed in pressurized fluid solvent, pressurized fluid solvent is pumped from the drum (112, 122). Finally, the drum is de-pressurized to atmospheric pressure to evaporate any remaining pressurized fluid solvent, yielding clean, solvent free textiles. The organic solvent is preferably selected from terpenes, halohydrocarbons, certain glycol ethers, polyols, ethers, esters of glycol ethers, esters of fatty acids and other long chain carboxylic acids, fatty alcohols and other long-chain alcohols, short-chain alcohols, polar aprotic solvents, siloxanes, hydrofluoroethers, dibasic esters, and aliphatic hydrocarbons solvents or similar solvents or mixtures of such solvents and the pressurized fluid solvent is preferably densified carbon dioxide.

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A. CLASSIFICATION OF SUBJECT MATTER

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P, X	WO 01 29305 A (RACETTE ET AL) 26 April 2001 (2001-04-26) the whole document -/-	1-108



Further documents are listed in the continuation of box C.



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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P, X	WO 01 29306 A (RACETTE ET AL) 26 April 2001 (2001-04-26)	1,2,6, 10,14, 18,22, 25,28, 32,36, 39,42, 45,48, 51, 54-56, 60,64, 68,72, 76,79, 82,86, 90,93, 96,99, 102,105, 108
A		3-5,7-9, 11-13, 15-17, 19-21, 23,24, 26,27, 29-31, 33-35, 37,38, 40,41, 43,44, 46,47, 49,50, 52,53, 57-59, 61-63, 65-67, 69-71, 73-75, 77,78, 80,81, 83-85, 87-89, 91,92, 94,95, 97,98, 100,101, 103,104, 106,107
A	the whole document ----- -/--	

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PCT/US 02/12304

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P, X	US 2002/010965 A1 (SCHULTE ET AL) 31 January 2002 (2002-01-31)	1, 2, 6, 10, 14, 18, 22, 25, 28, 32, 36, 39, 42, 45, 48, 51, 54-56, 60, 64, 68, 72, 76, 79, 82, 86, 90, 93, 96, 99, 102, 105, 108
A		3-5, 7-9, 11-13, 15-17, 19-21, 23, 24, 26, 27, 29-31, 33-35, 37, 38, 40, 41, 43, 44, 46, 47, 49, 50, 52, 53, 57-59, 61-63, 65-67, 69-71, 73-75, 77, 78, 80, 81, 83-85, 87-89, 91, 92
A	the whole document	94, 95, 97, 98, 100, 101, 103, 104, 106, 107

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 02/12304

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 417 768 A (SMITH, JR. ET AL) 23 May 1995 (1995-05-23) cited in the application	1,2,6, 10,14, 18,22, 25,28, 32,36, 39,42, 45,48, 51, 54-56, 60,64, 68,72, 76,79, 82,86, 90,93, 96,99, 102,105, 108
A		3-5,7-9, 11-13, 15-17, 19-21, 23,24, 26,27, 29-31, 33-35, 37,38, 40,41, 43,44, 46,47, 49,50, 52,53, 57-59, 61-63, 65-67, 69-71, 73-75, 77,78, 80,81, 83-85, 87-89, 91,92, 94,95, 97,98, 100,101, 103,104, 106,107
A	abstract column 6, line 3 - line 11 claim 1; figure --- -/--	

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 02/12304

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 97 38044 A (BESPAK PLC ET AL) 16 October 1997 (1997-10-16)	1,2,6, 10,14, 18,22, 25,28, 32,36, 39,42, 45,48, 51, 54-56, 60,64, 68,72, 76,79, 82,86, 90,93, 96,99, 102,105, 108
A		3-5,7-9, 11-13, 15-17, 19-21, 23,24, 26,27, 29-31, 33-35, 37,38, 40,41, 43,44, 46,47, 49,50, 52,53, 57-59, 61-63, 65-67, 69-71, 73-75, 77,78, 80,81, 83-85, 87-89, 91,92, 94,95, 97,98, 100,101, 103,104, 106,107
A	abstract page 4, line 10 - line 30; claims --- -/--	

INTERNATIONAL SEARCH REPORT

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 377 705 A (SMITH, JR. ET AL) 3 January 1995 (1995-01-03) cited in the application	1,2,6, 10,14, 18,22, 25,28, 32,36, 39,42, 45,48, 51, 54-56, 60,64, 68,72, 76,79, 82,86, 90,93, 96,99, 102,105, 108
A		3-5,7-9, 11-13, 15-17, 19-21, 23,24, 26,27, 29-31, 33-35, 37,38, 40,41, 43,44, 46,47, 49,50, 52,53, 57-59, 61-63, 65-67, 69-71, 73-75, 77,78, 80,81, 83-85, 87-89, 91,92, 94,95, 97,98, 100,101, 103,104, 106,107
A	abstract column 5, line 33 - line 41 column 6, line 2 - line 4 column 6, line 53 - column 7, line 1 column 8, line 19 - line 24; figure 1 -- -/--	

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International Application No

PCT/US 02/12304

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 944 996 A (DESIMONE ET AL) 31 August 1999 (1999-08-31) abstract column 2, line 57 - line 67 column 4, line 38 -column 5, line 4 column 6, line 7 - line 19 -----	1-108
A	US 5 279 615 A (MITCHELL ET AL) 18 January 1994 (1994-01-18) cited in the application abstract column 3, line 43 -column 4, line 7; figure 1 -----	1-108

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 02/12304

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 0129305	A	26-04-2001	US 6355072 B1	12-03-2002
			AU 8021700 A	30-04-2001
			AU 8021800 A	30-04-2001
			EP 1224351 A1	24-07-2002
			EP 1224352 A1	24-07-2002
			NO 20021764 A	14-06-2002
			NO 20021765 A	17-06-2002
			WO 0129305 A1	26-04-2001
			WO 0129306 A1	26-04-2001
			US 2002100124 A1	01-08-2002
			US 2002011258 A1	31-01-2002
			US 2002010965 A1	31-01-2002
WO 0129306	A	26-04-2001	US 6355072 B1	12-03-2002
			AU 8021700 A	30-04-2001
			AU 8021800 A	30-04-2001
			EP 1224351 A1	24-07-2002
			EP 1224352 A1	24-07-2002
			NO 20021764 A	14-06-2002
			NO 20021765 A	17-06-2002
			WO 0129305 A1	26-04-2001
			WO 0129306 A1	26-04-2001
			US 2002100124 A1	01-08-2002
			US 2002011258 A1	31-01-2002
			US 2002010965 A1	31-01-2002
US 2002010965	A1	31-01-2002	US 6355072 B1	12-03-2002
			AU 8021700 A	30-04-2001
			AU 8021800 A	30-04-2001
			EP 1224351 A1	24-07-2002
			EP 1224352 A1	24-07-2002
			NO 20021764 A	14-06-2002
			NO 20021765 A	17-06-2002
			WO 0129305 A1	26-04-2001
			WO 0129306 A1	26-04-2001
			US 2002100124 A1	01-08-2002
			US 2002011258 A1	31-01-2002
US 5417768	A	23-05-1995	US 5509431 A	23-04-1996
WO 9738044	A	16-10-1997	GB 2311992 A	15-10-1997
			AU 2516597 A	29-10-1997
			DE 69700551 D1	28-10-1999
			DE 69700551 T2	30-12-1999
			EP 0892825 A1	27-01-1999
			WO 9738044 A1	16-10-1997
			US 6241828 B1	05-06-2001
US 5377705	A	03-01-1995	NONE	
US 5944996	A	31-08-1999	US 5783082 A	21-07-1998
			US 6224774 B1	01-05-2001
			AU 7525896 A	22-05-1997
			EP 0958068 A1	24-11-1999
			JP 11514570 T	14-12-1999
			WO 9716264 A1	09-05-1997
			US 5866005 A	02-02-1999

INTERNATIONAL SEARCH REPORT
Information on patent family members

International Application No
PCT/US 02/12304

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5279615	A	18-01-1994	AT 127547 T	15-09-1995
			AU 661314 B2	20-07-1995
			AU 1815792 A	17-12-1992
			CA 2070760 A1	15-12-1992
			DE 69204567 D1	12-10-1995
			DE 69204567 T2	01-02-1996
			EP 0518653 A1	16-12-1992
			ES 2078659 T3	16-12-1995
			JP 3270523 B2	02-04-2002
			JP 5202388 A	10-08-1993
